



# ecology and environment, inc.


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International Specialists in the Environment

SFUND RECORDS CTR  
2390391

## MEMORANDUM

TO: Lisa Nelson, EPA Region IX

FROM: James M. James, Ecology and Environment, Inc. 

DATE: June 10, 1992

SUBJECT: Completed Work, Work Assignment No. 20-18-9J00

Attached is the following completed:

PA \_\_\_\_\_ SI \_\_\_\_\_ EPI PA \_\_\_\_\_ PA Review \_\_\_\_\_ SI Review \_\_\_\_\_

NPL Prioritization X SWIFT PA \_\_\_\_\_ SWIFT SI \_\_\_\_\_

Other \_\_\_\_\_

Site Name: Tri-City Landfill

EPA ID #: AZD980735781

City, County: Salt River Indian Community, Maricopa

Latitude: 33°28'00" N Longitude: 111°50'00" W

State Recommendation:  
(for Reviews only)

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FOR EPA USE ONLY

CERCLIS Lead:

tn/tcl/cwm-trans

\*\*\*\*\*CONFIDENTIAL\*\*\*\*\*PREDECISIONAL DOCUMENT\*\*\*\*\*

**NPL PRIORITIZATION CRITERIA MEMO**

**SUBMITTED TO:** Lisa Nelson, EPA Region IX Site Assessment Manager

**PREPARED BY:** Teryl K. Nuckols, Ecology and Environment, Inc. *TN*

**DATE:** June 10, 1992

**SITE:** Tri-City Landfill  
Salt River Indian Community  
Scottsdale, AZ  
Maricopa

**EPA ID#:** AZD980735781

**E & E REVIEW/CONCURRENCE:** *Karen Jadd June 15, 1992*

Ecology and Environment, Inc. (E & E) evaluated each of the following criteria in order to assist the U.S. Environmental Protection Agency (EPA) in determining if this site is appropriate for NPL consideration.

**PRESENT AND FUTURE STATE INVOLVEMENT**

The Arizona Department of Environmental Quality (ADEQ) has been involved with the Tri-City Landfill site due to two problems: wastes from the landfill were recently washed downstream due to flooding of the Salt River, and chlorinated solvents have been detected in drinking water, irrigation, and monitoring wells downgradient from the site (1). Because the Tri-City Landfill site is owned and operated by an Indian reservation (the Salt River Indian Community [SRIC]), Arizona state regulatory programs do not apply (2,3). In order to address problems potentially associated with the site, ADEQ and SRIC have been attempting to achieve a cooperative agreement. The agreement has reportedly fallen through recently over site access difficulties (3). The future of ADEQ involvement at the site is therefore unknown.

**OTHER REGULATORY AGENCY INVOLVEMENT**

Although SRIC does not have its own regulatory program to address environmental problems, the reservation has hired a consultant (Ken Schmidt and Associates) to study the flooding and groundwater problems

potentially associated with the site (1,3). One study was completed in 1990, and a second one is currently underway (3,4).

As a municipal solid waste landfill, the Tri-City Landfill site is regulated under the Resource Conservation and Recovery Act (RCRA) Subtitle D. Although there are no federal permit programs for municipal solid waste landfills, EPA has conducted inspections of the site. An informal RCRA inspection was conducted on December 2, 1987. EPA has also assessed the site more recently in order to determine compliance with 40 CFR 257. This study also reported problems with flooding of the site and with groundwater contamination (3).

In early 1992, the U.S. Army Corps of Engineers (the Corps) worked with the reservation and state agencies to place emergency berms around the landfill in order to prevent more wastes from being washed away by the Salt River (2). In addition, the Corps is in the process of determining the impact that landfill has on the waters of the United States (the Salt River), with the intention of preventing the potential migration of solid waste and hazardous substances to the waters of the United States. Future Corps involvement at the site is unknown (5).

#### COMMUNITY RELATIONS/INVOLVEMENT

Although groundwater contamination appears to be a potential concern for this site, media attention has focussed on the flooding of the Salt River. The most recent flooding event which occurred at the Tri-City Landfill (starting December 18, 1991 and peaking February 14, 1992) was highly publicized (1,6). This prompted a large meeting between representatives of SRIC, ADEQ, the Salt River Project, the two Arizona senators, two Arizona congressional representatives, and the Arizona governor in February 1992. Publicity involved newspaper and television coverage, including a helicopter flight over the landfill and the Salt River (1).

#### RELATION TO OTHER SITES

The Tri-City Landfill site includes three areas: the main cell of the current Tri-City Landfill (the main cell), a second cell of the current Tri-City Landfill (the second cell), and the Old Tri-City Landfill (see Figure 1, Site Location Map). The main cell is located on SRIC land and is in operation at this time (7). The second cell is located approximately 0.5 miles south of the main cell, is located on SRIC land, and is operating intermittently at this time (7,8). The Old Tri-City Landfill is located approximately 0.75 miles to the southwest of the main cell, and is also located on SRIC land. This landfill is not in operation (2).

The North Center Street Landfill (EPA ID # AZD981691496) is located south of the current Tri-City Landfill and east of the Old Tri-City Landfill. This facility was formerly operated by the City of Mesa and is not part of the Tri-City Landfill site (2).



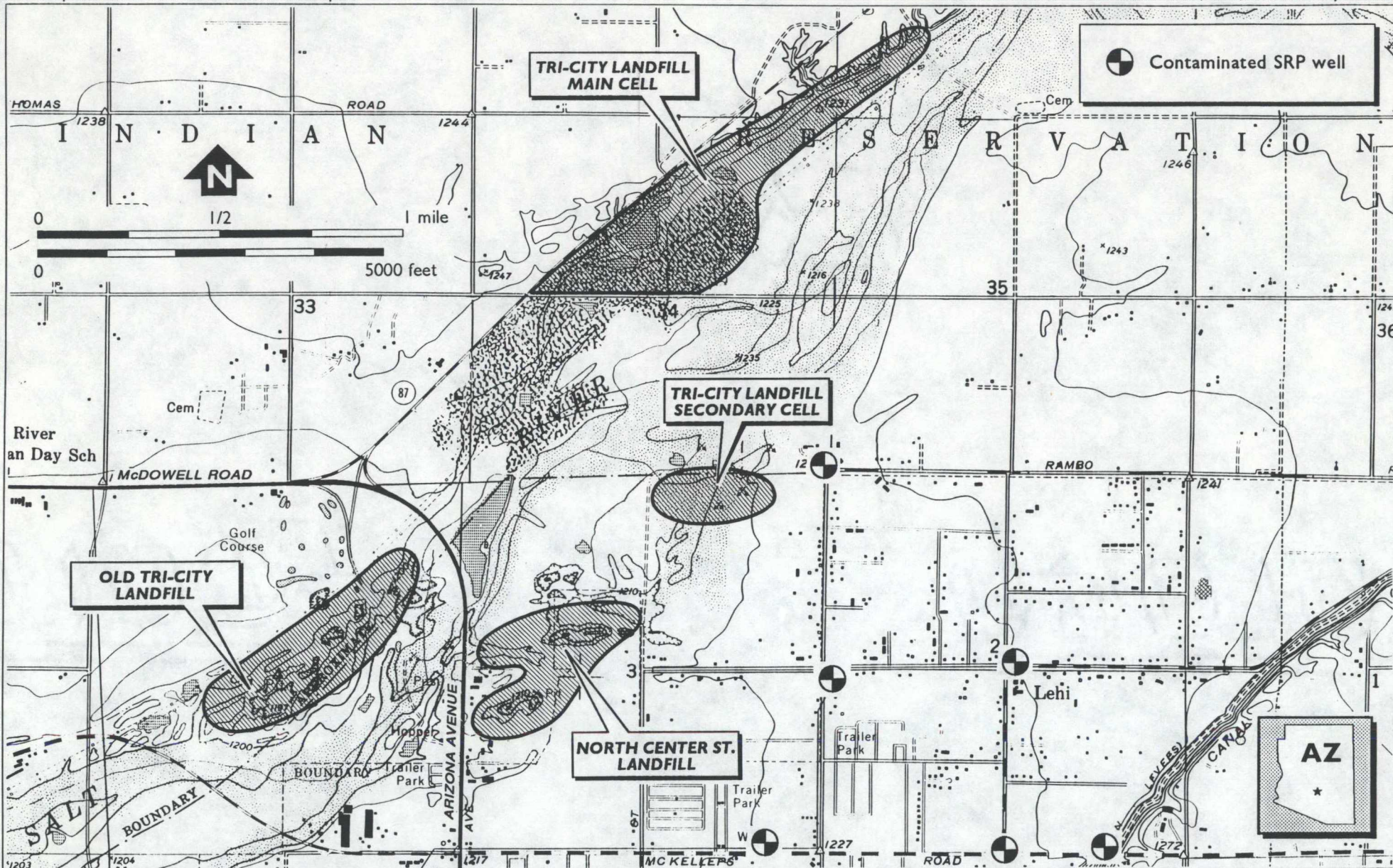


Figure 1  
**SITE LOCATION**  
**TRI-CITY LANDFILL**  
 Salt River Indian Community  
 Mesa & Scottsdale, Arizona



## HRS FACTORS

Although it may be possible to document an observed release to surface water through sampling of Salt River sediments, the toxicities of the chlorinated solvents potentially associated with the site are not high, and the targets associated with this pathway are low (resources and possibly three sensitive environment species). This pathway therefore does not contribute substantially to the overall HRS score for this site, in spite of its media attention.

However, several chlorinated solvents have been detected at Level I concentrations in six drinking water wells downgradient from the site. The wells are owned by the Salt River Project and contain up to 14.0 micrograms per liter ( $\mu\text{g/l}$ ) of perchloroethylene (PCE), among other compounds (9,10). The 10-6 cancer risk for PCE is 0.67  $\mu\text{g/l}$  (11). Under the HRS, these wells serve approximately 16,236 people (9,10).

Attribution of the chlorinated solvents detected in Salt River Project wells is the major HRS issue for the Tri-City Landfill site. To date, no samples have been collected in the landfill to establish the presence of chlorinated solvents, and there are no known reports of chlorinated solvents being illegally disposed of in the municipal solid waste landfill (2,7).

Even more importantly, there is no adequate background well. One monitoring well is located upgradient of the Old Tri-City Landfill. However, there is no background well located upgradient of the main cell of the current Tri-City Landfill, which contains the largest area of waste (7). While most of the area upgradient of the site (all three landfill cells) is rural, the SRIC town is located approximately 2 miles upgradient from the site, and a former oil refinery is reportedly exists at an unknown location in the vicinity of the site (2,7). The possibility of an off-site source (such as illegal dumping) also cannot be eliminated without an appropriately located background well.

In addition, the possibility of groundwater contamination from the North Center Street Landfill needs to be distinguished from groundwater contamination which appears to be attributable to the Tri-City Landfill site.

The screening intervals of the various wells studied also need to be obtained in order to determine the comparability of the data from these wells.

Groundwater in the area of the site flows toward the southeast (7). Depth to groundwater is approximately 200 feet below ground surface in the area of the site (10).

# MATRIX INFORMATION SUMMARY

Projected HRS Score: 50.03

Site Name: Tri-City Landfill  
City: Salt River Indian Community, Scottsdale  
County: Maricopa  
State: Arizona

Actual Release: Groundwater projected  
Surface water projected

Level of Contamination  
Relative to Health -  
Based Benchmark: Six drinking water wells are contaminated  
with PCE at levels of up to 14  $\mu\text{g}/\text{l}$ , and  
greater than 0.67  $\mu\text{g}/\text{l}$  (the  $10^{-6}$  cancer  
risk for PCE).

Waste Type: PCE; TCE; t-1,2-DCE; 1,1-DCE; 1,2-DCA;  
and 1,1,1-TCA.

Source/Waste Quantity: Landfill: approximately 12,000,000  
square feet.

Target Population: Over 16,000 people considered Level I  
groundwater drinking water targets

Actual Contamination: Level I projected

Visibility: High

Sensitive Environment: Potential contamination projected for  
three endangered species which may be  
located downstream on the Salt River.

Current State Lead: ADEQ is involved, but has no legal  
jurisdiction since the site is on Indian  
lands.

#### REFERENCES

1. Graf, Chuck, Arizona Department of Environmental Quality, and Teryl K. Nuckols, Ecology and Environment, Inc. (E & E), telephone conversation, April 2, 1992.
2. Ecology and Environment, Inc., "CERCLA Site Inspection, Tri-City Landfill, Salt River Indian Reservation, Arizona," January 23, 1987.
3. Thornton, Brian, U.S. Environmental Protection Agency, and Teryl K. Nuckols, E & E, telephone conversation, March 26, 1992.
4. Mertely, Frank, Salt River Indian Community, and Teryl K. Nuckols, E & E, April 7, 1992.
5. Fowler, Ron, U.S. Army Corps of Engineers, and Teryl K. Nuckols, E & E, telephone conversation, April 20, 1992.
6. Riegel, Dallas, Salt River Project, and Teryl K. Nuckols, E & E, telephone conversation, May 15, 1992.
7. Kenneth D. Schmidt and Associates, "Groundwater Quality in the Vicinity of the Tri-Cities Landfill," prepared for the Salt River Indian Community, Scottsdale, Arizona, July 16, 1990.
8. Mertely, Frank, Salt River Indian Community, and Teryl K. Nuckols, E & E, May 15, 1992.
9. Elliott, Gregg, Salt River Project, and Teryl K. Nuckols, E & E, telephone conversation, April 2, 1992.
10. Elliott, Gregg, Salt River Project, and Teryl K. Nuckols, E & E, letter and enclosures, April 22, 1992.
11. U.S. Environmental Protection Agency, Superfund Chemical Data Matrix, Appendix B-1, Tables for Non-radioactive Hazardous Substances, November 1991 (revised December 1991).

CONTACT LOG

Facility Name: Tri-City Landfill  
Facility ID: AZD980735781

Name	Affiliation	Phone #	Date	Information
Brian Thornton	U.S. Environmental Protection Agency (EPA)	(415) 744-2093	3/26/92	See contact report.
Clyde Morris	EPA	(415) 744-1962	3/27/92	Army Corps of Engineers has pursued the site under the Clean Water Act, since wastes from the site were discharged to U.S. waters (the Salt River). Parts of the landfill itself are also located in U.S. waters.
Roxina Lawatch	EPA	(415) 744-1602	3/30/92	The contact at the Salt River Indian Reservation is Frank Mertely (602) 941-7378. The current environmental study is being conducted by a consultant to the reservation and is independent of EPA involvement. This study is considering the flood plain, and the siting of the landfill.
Jim Gaetjens	Mesa Department of Public Works	(602) 644-2130	4/2/92	See contact report.
Gregg Elliott	Salt River Project	(602) 236-5545	4/2/92	See contact report.
Chuck Graf	Arizona Department of Environmental Quality (ADEQ)	(602) 207-4417	4/2/92	See contact report.



Norm Fenlison	City of Mesa Planning Department	(602) 644-2185	4/6/92	The total population of Mesa is 283,963 according to 1990 census data. The total number of housing units is 138,876.
Frank Mertely	Salt River Indian Community	(602) 941-7279	4/7/92	See contact report.
Bill Haney	Mesa Department of Public Works	(602) 644-2231	4/15/92	See contact report.
Ron Fowler	U.S. Army Corps of Engineers	(602) 240-5385	4/20/92	See contact report.
Gregg Elliott	Salt River Project	(602) 236-5545	4/21/92	All of the wells in Mesa are screened over the upper aquifer, though some are also screened over the lower aquifer.
Frank Mertely	Salt River Indian Community	(602) 941-7279	5/7/92	The winter population of the reservation is approximately 6,500. The summer population drops to almost zero.
Frank Mertely	Salt River Indian Community	(602) 941-7279	5/15/92	The landfill cell located at McDowell & Center is located on Indian land, and is used intermittently. They plan to close it some time in the future.
Dallas Riegel	Salt River Project	(602) 236-2271	5/15/92	Flow in the Salt River which caused flooding at the Tri-City Landfill started on 12/18/91 and peaked 2/14/92. The highest flow was 13,750 cubic feet per second. The flow will continue until June 15 at the latest.

### CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> U.S. Environmental Protection Agency		
<b>DEPARTMENT:</b>		
<b>ADDRESS/CITY:</b> San Francisco		
<b>COUNTY/STATE/ZIP:</b> California		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Brian Thornton	Env. Protection Specialist	(415) 744-2093
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Teryl K. Nuckols		<b>DATE:</b> 3/26/92
<b>SUBJECT:</b> History and Regulatory Involvement at Tri-City Landfill.		
<b>SITE NAME:</b> Tri-City Landfill		<b>EPA ID#:</b> AZD980735781

As a landfill, the Tri-City Landfill site is regulated under the Resource Conservation and Recovery Act (RCRA) Subtitle D (municipal solid waste), but not under Subtitle C.

The site is listed under the same EPA ID# for RCRA and CERCLA purposes. There are no federal permit programs for municipal solid waste landfills, but EPA has conducted inspections of the site. On December 2, 1987, there was an informal RCRA site inspection (recorded in RCRA files). More recently, EPA looked at the site to determine its compliance with 40 CFR 257. This RCRA study reported problems with flooding of the site and with groundwater contamination. Groundwater testing was conducted under RCRA and reported in this document.

Since the site is located on Indian lands, Arizona state regulatory programs do not apply. The Salt River Indian Reservation does not have its own regulatory program to address such problems. The state has been attempting to achieve a cooperative agreement with the reservation, but it fell through due to access difficulties.

The Arizona Department of Environmental Quality contact for this site is Chuck Graf (602) 257-2100. It has been a couple of years since he has been involved with the site.

The reservation has recently hired a consultant to evaluate the groundwater problems associated with the site. Contact EPA Region IX Indian Lands Coordinator Roxina Lawatch at (415) 744-1602 to let her know of the investigation and to find out who the contact at the tribe is.

The U.S. Army Corps of Engineers has recently worked with the tribe and state agencies to place emergency berms around the landfill in order to prevent more washout into the Santa Cruz River. There was a coordination meeting with EPA and these other groups in February 1992 on these activities.

Contacts: Ron Fowler at the Army Corps of Engineers at (602) 640-5385, Clyde Morris at EPA Water Quality at (415) 744-1962, and Ken Greenberg, EPA, at (415) 744-1905.

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> Mesa Department of Public Works		
<b>DEPARTMENT:</b> Utilities		
<b>ADDRESS/CITY:</b> Mesa		
<b>COUNTY/STATE/ZIP:</b> Arizona		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Jim Gaetjens	Asst. Utilities Manager	(602) 644-2130
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Teryl K. Nuckols		<b>DATE:</b> 4/2/92
<b>SUBJECT:</b> Drinking water wells in the city of Mesa.		
<b>SITE NAME:</b> Tri-City Landfill		<b>EPA ID#:</b> AZD980735781

The water system of the City of Mesa Department of Public Works is an interconnected system with six pressure zones. Surface water supplies 95 percent of the water, and groundwater supplies 5 percent. The total population served by the system is 380,000 (the population of Mesa itself is 300,000). There are 26 groundwater wells, all of which are located within the city limits. The wells have similar productions in general, but the contribution of any given well varies with local need.

Previously groundwater provided a much greater proportion of drinking water for the city. In 1972, 100 percent of the water was from groundwater. The percentage has been decreasing consistently since then due to depleted groundwater reserves.

The Department of Public Works samples wells for organics and inorganics once per year. No contamination has been detected to date.

Contact Bill Haney, Assistance Utilities Manager, P.O. Box 1466, Mesa, AZ 85211-1466, for well location information and sampling data.

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> Salt River Project		
<b>DEPARTMENT:</b> Water Quality		
<b>ADDRESS/CITY:</b> Phoenix		
<b>COUNTY/STATE/ZIP:</b> Arizona		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Gregg Elliott	Water Quality Analyst	(602) 236-5545
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Teryl K. Nuckols		<b>DATE:</b> 4/2/92
<b>SUBJECT:</b> Drinking water wells in the city of Mesa.		
<b>SITE NAME:</b> Tri-City Landfill		<b>EPA ID#:</b> AZD980735781

The Salt River Project (SRP) provides water for agriculture, urban irrigation, and domestic water use. SRP represents an interconnected water delivery system. Flow in the system is from the northeast to the southwest. SRP water comes from reservoirs located northeast of Mesa and from 250 groundwater wells located throughout the Phoenix/Tempe/Mesa area. The water in the reservoirs comes from the Salt and Verde rivers, which are dammed and diverted just below their point of confluence. The Salt River does not flow downstream from this point unless flow is diverted past the dams on purpose. This only occurs when the reservoirs are full above desired levels--which may happen once a year or less. SRP does plan to release water down the Salt River this year. The Salt River is regulated for aquatic wildlife and irrigation, but generally has no other uses since it is usually just a dry river bed.

A canal system delivers water from the SRP to various municipalities downstream. While there are 1,200 entry points along the entire canal system which receive return flow from agricultural irrigation and storm water run-off, water from the Salt River does not flow into the canals below the dam. In the area of the Tri-City Landfill site, drainage is toward the Salt River. Based on topography in the area, Mr. Elliott believes that there is no possible overland migration of contaminants from the site to the SRP canal system.

Several production (drinking water included) wells in the area of the site have shown contamination. SRP does not divert any groundwater with known contamination into the canal system.

Mr. Elliott said he will mail me well location information, average annual production information for wells in Mesa, sampling data, and information on the average population served per unit of water delivered, etc.



# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> Arizona Department of Environmental Quality (ADEQ)		
<b>DEPARTMENT:</b>		
<b>ADDRESS/CITY:</b> Mesa		
<b>COUNTY/STATE/ZIP:</b> Arizona		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Chuck Graf		(602) 207-4417
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Teryl K. Nuckols		<b>DATE:</b> 4/2/92
<b>SUBJECT:</b> History of Tri-City Landfill.		
<b>SITE NAME:</b> Tri-City Landfill		<b>EPA ID#:</b> AZD980735781

Mr. Graf's involvement with the site ended a couple of years ago. ADEQ has been very involved with the site recently due to publicity over wastes from the landfill washing into the Salt River. There was recently a large meeting between the reservation, ADEQ, SRP, two senators, two congressional representatives, and the governor, etc. The publicity included both television and newspaper coverage.

Ken Schmidt and Associates, consultants to the reservation, completed a study of the site in 1990. This project involved the installation of three additional monitoring wells and sampling conducted at nearby irrigation wells. The levels of chlorinated solvents in groundwater appear to be declining. Groundwater elevations in the area of the site have been also declining since 1983. Mr. Graf believes that the monitoring wells are screened at the top 25 to 50 feet of the water table.

There is no monitoring well located upgradient from the site. The portion of the Tri-City Landfill located south of the Santa Cruz River and the Old Tri-City Landfill were not adequately addressed by studies to date, and warrant further investigation.

Frank Mertley at the reservation is the correct person to contact for further information and the report.

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> Salt River Indian Community		
<b>DEPARTMENT:</b>		
<b>ADDRESS/CITY:</b> Route 1, Box 216		
<b>COUNTY/STATE/ZIP:</b> Scottsdale, AZ 85256		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Frank Mertely	Community Manager	(602) 941-7279
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Teryl K. Nuckols		<b>DATE:</b> 4/7/92
<b>SUBJECT:</b> Salt River Indian Reservation's involvement at site.		
<b>SITE NAME:</b> Tri-City Landfill		<b>EPA ID#:</b> AZD980735781

The Salt River Indian Community is currently having a consultant collect samples at the Tri-City Landfill site. A report completed in 1990 is available now, but the results of the current sampling project will not be available for a while. There are two volumes from the 1990 investigation: a shorter summary volume, and a much larger volume containing the data.

The Salt River Indian Community has two wells for drinking water production. They monitor the water quality, but do not sample for volatile organic compounds. The system is interconnected. No water is provided by surface water.

Mr. Mertely requested that I send him a letter of authorization and a request for the reports and/or information I need.

# CONTACT REPORT

<b>AGENCY/AFFILIATION:</b> City of Mesa		
<b>DEPARTMENT:</b> Department of Public Works		
<b>ADDRESS/CITY:</b> Mesa		
<b>COUNTY/STATE/ZIP:</b> Arizona		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Bill Haney		(602) 644-2231
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Teryl K. Nuckols		<b>DATE:</b> 4/15/92
<b>SUBJECT:</b> City of Mesa drinking water wells.		
<b>SITE NAME:</b> Tri-City Landfill		<b>EPA ID#:</b> AZD980735781

One well in Mesa has a DBCP problem. There are no other groundwater quality problems. Mesa uses water from three sources: the Salt River, the Colorado River, and groundwater. Groundwater is generally used for about 1 week in the fall, and for a couple of weeks every 2 to 3 years. Last year the wells were used more due to atypical supply from the Salt River. Overall, an average of 5 percent of water is supplied by groundwater.

# **CONTACT REPORT**

<b>AGENCY/AFFILIATION:</b> U.S. Army Corps of Engineers		
<b>DEPARTMENT:</b>		
<b>ADDRESS/CITY:</b> Mesa		
<b>COUNTY/STATE/ZIP:</b> Arizona		
<b>CONTACT(S)</b>	<b>TITLE</b>	<b>PHONE</b>
1. Ron Fowler		(602) 240-5385
2.		
<b>E &amp; E PERSON MAKING CONTACT:</b> Teryl K. Nuckols		<b>DATE:</b> 4/15/92
<b>SUBJECT:</b> Involvement at Tri-City Landfill site.		
<b>SITE NAME:</b> Tri-City Landfill		<b>EPA ID#:</b> AZD980735781

The U.S. Army Corps of Engineers is determining the impacts the landfill has on the waters of the United States. They are in the process of requesting the development of a remediation plan by the reservation. This plan will address: landfill bank stabilization to preclude erosion into the river, and leachate migration into the river.

Preliminary work has been done by the reservation, which is requesting that the U.S. government pay for the studies.

Future involvement at the site is unknown. There may be none after these issues are addressed.



\*\*\*\*\* CONFIDENTIAL \*\*\*\*\*  
\*\*\*\*\* PREDECISIONAL DOCUMENT \*\*\*\*\*

SUMMARY SCORESHEET  
FOR COMPUTING PROJECTED HRS SCORE

SITE NAME: TRI-CITY LANDFILL  
CITY, COUNTY: SALT RIVER INDIAN COMMUNITY  
SCOTTSDALE, MARICOPA EVALUATOR: T. NUCKOLS  
EPA ID #: AZD980735781 DATE: JUNE 10, 1991  
Lat/Long: 33°28'00"N / 111°50'00"W T/R/S: T1N R5E SEC 3+4 AND  
T2N R5E SEC 33+34  
THIS SCORESHEET IS FOR A: PA      SI      LSI       
PA/SI Review      NPL Prioritization X SWIFT PA      SWIFT SI       
Other (Specify)     

RCRA STATUS (check all that apply):

     Generator      Small Quantity Generator      Transporter      TSDF  
X Not Listed in RCRA Database Date of printout: 10/16/91

STATE SUPERFUND STATUS:

     BEP (date)      /           WQARF Area: NONE  
     No State Superfund Status

	S pathway	S <sup>2</sup> pathway
Groundwater Migration Pathway Score (S <sub>gw</sub> )	100.00	10,000.00
Surface Water Migration Pathway Score (S <sub>sw</sub> )	2.6	6.76
Soil Exposure Pathway Score (S <sub>s</sub> )	★	—
Air Migration Pathway Score (S <sub>a</sub> )	★	—
$S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$	XXXXXX	10,006.76
$(S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2)/4$	XXXXXX	2,501.69
$\sqrt{(S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2)/4}$	XXXXXX	50.02

\*Pathways not assigned a score (explain):

PATHWAYS EACH CONTRIBUTE LESS THAN 10, SO WERE  
NOT EVALUATED



# GROUNDWATER MIGRATION PATHWAY SCORESHEET

## Factor Categories and Factors

	<u>Likelihood of Release</u>	<u>Maximum Value</u>	<u>Projected Score</u>	<u>Rationale</u>	<u>Data Qual.</u>
1.	Observed Release	550	550	1	E
2.	Potential to Release				
2a.	Containment	10			
2b.	Net Precipitation	10			
2c.	Depth to Aquifer	5			
2d.	Travel Time	35			
2e.	Potential to Release [Lines 2a x (2b+2c+2d)]	500			
3.	Likelihood of Release (Higher of lines 1 or 2e)	550	550		
<u>Waste Characteristics</u>					
4.	Toxicity/Mobility	a	100	2	E
5.	Hazardous Waste Quantity	a	100	3	H
6.	Waste Characteristics (lines 4 x 5, then use Table 2-7)	100	10		
<u>Targets</u>					
7.	Nearest Well	50	50	4	E
8.	Population <sup>d</sup>				
8a.	Level I Concentrations	b	162,360	5	E
8b.	Level II Concentrations	b			
8c.	Potential Contamination	b	455.7	6	E
8d.	Population (lines 8a+8b+8c)	b			
9.	Resources	5	5	7	H
10.	Wellhead Protection Area	20			
11.	Targets (lines 7+8d+9+10)	b	162,870.7		
<u>Likelihood of Release</u>					
12.	Aquifer Score [(Lines 3 x 6 x 11)/82,500] <sup>c</sup>	100	100		
<u>Groundwater Migration Pathway Score</u>					
13.	Pathway Score (Sgw), (highest value from line 12 for all aquifers evaluated)	100	100		

- a Maximum value applies to waste characteristics category.  
b Maximum value not applicable.  
c Do not round to the nearest integer.  
d Use additional tables.



# GROUNDWATER PATHWAY CALCULATIONS

## 8. Population

### Actual Contamination

Well Identifier	Contaminant Detected	Concentration (Note Units)	Benchmark	(A) Apportioned Population Well Serves	(B) Level* Multip.	(A x B)
6 SRP Wells	PCE	<sup>OVER</sup> 0.7 $\mu\text{g/L}$	0.67 $\mu\text{g/L}$	16,236	10	162,360
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
Sum (AXB) Level I						162,360
Sum (AXB) Level II						_____

### \* Multipliers

- Level I = 10
- Level II = 1

### Potential Contamination

Distance (miles)	Total Number of Wells Within Distance Ring	Total Population Served by Wells Within Distance Ring	Distance-Weighted Population Values "Other Than Karst" (Table 3-12) (A)
0 to 1/4	0	0	0
>1/4 to 1/2	0	0	0
>1/2 to 1	1	2,844	523
>1 to 2	6	13,269	2,939
>2 to 3	6	4,385	678
>3 to 4	9	9,096	417
Sum (A)			4,557

Potential contamination =  $\frac{\text{Sum (A)}}{10} = 455.7$

- \* For drinking water wells that draw from a karst aquifer, see the Distance-Weighted Population Values for "Karst" in Table 3-12.



# SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

## Factor Categories and Factors

### DRINKING WATER THREAT

	<u>Likelihood of Release</u>	<u>Maximum Value</u>	<u>Projected Score</u>	<u>Rationale</u>	<u>Data Qual.</u>
1.	Observed Release	550	<u>550</u>	<u>8</u>	<u>E</u>
2.	Potential to Release by Overland Flow				
2a.	Containment	10	<u>          </u>	<u>          </u>	<u>          </u>
2b.	Runoff	25	<u>          </u>	<u>          </u>	<u>          </u>
2c.	Distance to Surface Water	25	<u>          </u>	<u>          </u>	<u>          </u>
2d.	Potential to Release by Overland Flow [lines 2a x (2b+2c)]	500	<u>          </u>	<u>          </u>	<u>          </u>
3.	Potential to Release by Flood				
3a.	Containment (Flood)	10	<u>          </u>	<u>          </u>	<u>          </u>
3b.	Flood Frequency	50	<u>          </u>	<u>          </u>	<u>          </u>
3c.	Potential to Release by Flood (lines 3a x 3b)	500	<u>          </u>	<u>          </u>	<u>          </u>
4.	Potential to Release (Lines 2d+3c, subject to a maximum of 500)	500	<u>          </u>	<u>          </u>	<u>          </u>
5.	Likelihood of Release (Higher of lines 1 or 4)	550	<u>550</u>	<u>          </u>	<u>          </u>

### Waste Characteristics

6.	Toxicity/Persistence	a	<u>40</u>	<u>9</u>	<u>E</u>
7.	Hazardous Waste Quantity	a	<u>100</u>	<u>3</u>	<u>E</u>
8.	Waste Characteristics (lines 6 x 7, then assign a value from Table 2-7)	100	<u>6</u>	<u>          </u>	<u>          </u>

### Targets

9.	Nearest Intake	50	<u>0</u>	<u>10</u>	<u>H</u>
10.	Population				
10a.	Level I Concentrations	b	<u>          </u>	<u>          </u>	<u>          </u>
10b.	Level II Concentrations	b	<u>          </u>	<u>          </u>	<u>          </u>
10c.	Potential Contamination	b	<u>          </u>	<u>          </u>	<u>          </u>
10d.	Population (lines 10a + 10b+10c)	b	<u>0</u>	<u>10</u>	<u>H</u>
11.	Resources	5	<u>5</u>	<u>10</u>	<u>H</u>
12.	Targets (lines 9+10d+11)	b	<u>5</u>	<u>          </u>	<u>          </u>

### Drinking Water Threat Score

13.	Drinking Water Threat [(Lines 5 x 8 x 12)/82,500, subject to a maximum of 100]	100	<u>0.2</u>	<u>          </u>	<u>          </u>
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# SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET (CONTINUED)

## Factor Categories and Factors

### **HUMAN FOOD CHAIN THREAT**

<u>Likelihood of Release</u>	<u>Maximum Value</u>	<u>Projected Score</u>	<u>Rationale</u>	<u>Data Qual.</u>
14. Likelihood of Release (Same value as line 5)	550	<u>550</u>	<u>8</u>	<u>E</u>
<u>Waste Characteristics</u>				
15. Toxicity/Persistence/ Bioaccumulation	a	<u>-</u>	<u>      </u>	<u>      </u>
16. Hazardous Waste Quantity	a	<u>-</u>	<u>      </u>	<u>      </u>
17. Waste Characteristics (Toxicity/Persistence x Hazardous Waste Quantity x Bioaccumulation, then assign a value from Table 2-7)	1,000	<u>-</u>	<u>      </u>	<u>      </u>
<u>Targets</u>				
18. Food Chain Individual	50	<u>-</u>	<u>      </u>	<u>      </u>
19. Population <sup>d</sup>				
19a. Level I Concentrations	b	<u>-</u>	<u>      </u>	<u>      </u>
19b. Level II Concentrations	b	<u>-</u>	<u>      </u>	<u>      </u>
19c. Potential Human Food Chain Contamination	b	<u>-</u>	<u>      </u>	<u>      </u>
19d. Population (lines 19a+19b+19c)	b	<u>-</u>	<u>      </u>	<u>      </u>
20. Targets (lines 18+19d)	b	<u>0</u>	<u>11</u>	<u>H</u>
<u>Human Food Chain Threat Score</u>				
21. Human Food Chain Threat [(Lines 14 x 17 x 20)/82,500 subject to a maximum of 100]	100	<u>0</u>	<u>      </u>	<u>      </u>



# SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET (CONTINUED)

## Factor Categories and Factors

### ENVIRONMENTAL THREAT

	<u>Likelihood of Release</u>	<u>Maximum Value</u>	<u>Projected Score</u>	<u>Rationale</u>	<u>Data Qual.</u>
22.	Likelihood of Release (Same value as line 5)	550	<u>550</u>	<u>8</u>	<u>E</u>
	<u>Waste Characteristics</u>				
23.	Ecosystem Toxicity/Persistence/ Bioaccumulation	a	<u>2,000</u>	<u>9</u>	<u>E</u>
24.	Hazardous Waste Quantity	a	<u>100</u>	<u>3</u>	<u>E</u>
25.	Waste Characteristics (Ecosystem Tox./Persistence x Hazardous Waste Quantity x Bioaccumulation, then assign a value from Table 2-7)	1,000	<u>18</u>		
	<u>Targets</u>				
26.	Sensitive Environments <sup>d</sup>				
26a.	Level I Concentrations	b			
26b.	Level II Concentrations	b			
26c.	Potential Contamination	b	<u>20</u>	<u>12</u>	<u>E</u>
26d.	Sensitive Environments (lines 26a+26b+26c)	b			
27.	Targets (Value from line 26d)	b	<u>20</u>		
	<u>Environmental Threat Score</u>				
28.	Environmental Threat Score [(lines 22 x 25 x 27)/82,500 subject to a maximum of 60]	60	<u>2.4</u>		

### SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED

29.	Watershed Score [(Lines 13+21+28), subject to a maximum of 100]	100	<div style="border: 1px solid black; padding: 2px; display: inline-block;">2.6</div> <sup>c</sup>
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### SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE

30.	Component Score (Sof) (Highest score from Line 29 for all watersheds evaluated, subject to a maximum of 100)	100	<div style="border: 1px solid black; padding: 2px; display: inline-block;">2.6</div> <sup>c</sup>
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- a Maximum value applies to waste characteristics category.  
b Maximum value not applicable.  
c Do not round to the nearest integer.  
d Use additional tables



**SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT CALCULATIONS (CONTINUED).**

## 27. Environmental Targets

### Actual Contamination

[illegible]

### \* Level Multipliers

- Level I = 10
- Level II = 1

## Potential Contamination

Sensitive Environment or Wetland Length (miles)	(A) Assigned Value (Table 4-23 and/or 4-24)	Average Stream Flow (cfs)	(DW) Dilution Weighting Factor (Table 4-13)	(A x DW)
LEOPARD FROG	50	10	1	50
BALD EAGLE	75	10	1	75
YUMA CLAPPER RAIL	75	10	1	75
Sum of (A x DW)				200

$$\text{Potential contamination} = \frac{\text{Sum (A x DW)}}{10} = \frac{20}{10}$$



## RATIONALE

### Groundwater

1. Groundwater beneath and downgradient from the site contains chlorinated solvents (1,2,3). One upgradient monitoring well does not contain such solvents, but this well is not in an adequate location to rule out the possibility of alternative upgradient sources (2). However, the land upgradient of the site is reportedly exclusively agricultural (4). Based on the available information, project an observed release to groundwater from the site.
2. Toxicity/Mobility: The following compounds were detected in groundwater beneath the site (1,2,5):

<u>Compound</u>	<u>Toxicity</u>	<u>Mobility</u>	<u>Tox/Mob</u>
1,1-DCE	100	1*	100
t-1,2-DCE	100		
1,1-DCA	10		
1,2-DCA	100		
1,1,1-TCA	10		
TCE	10		
PCE	100		

\* Due to an observed release by chemical observation.

3. Waste Quantity: Based on maps of the site, the area appears to be (2):  
Old Tri-City Landfill:  $4,000 \times 1,000 \text{ ft}^2$   
Current Tri-City Landfills:  $2,000 \times 4,000 \text{ ft}^2$ ;  $1,500 \times 500 \text{ ft}^2$   
Total Area = 12,750,000 square feet  
Waste Quantity Factor (gw,sw,soil,air) = 3,750  
Area of Contamination Factor (soil) = 100

In addition, due to actual contamination of drinking water wells, use a default of 100.

4. Nearest well: Several Salt River Project (SRP) public supply wells contain perchloroethylene (PCE) and other solvents (2,3). The  $10^{-6}$  EPA/CHEA Cancer Risk for PCE is 0.67 micrograms per liter ( $\mu\text{g/l}$ ) (5). Assuming the PCE contamination is attributable to the Tri-City Landfill site, these SRP wells contain Level I concentrations of PCE.

<u>SRP Well #</u>	<u>PCE Level</u>
28.5E5N	14.0 $\mu\text{g/l}$
28.6E5.5N	2.4 $\mu\text{g/l}$
27.9E5N	2.2 $\mu\text{g/l}$
28.8E5N	4.4 $\mu\text{g/l}$
28E5.5N	7.5 $\mu\text{g/l}$
28E6N	0.7 $\mu\text{g/l}$



## 5. Level I Concentrations:

SRP provides water for irrigation and public drinking water. This interconnected system serves a total population of approximately 500,000. Both surface water (from upstream reservoirs) and groundwater (from approximately 250 wells throughout the Phoenix/Tempe/Mesa area) are used. The total production of the system is approximately 1,000,000 acre-feet per year (3). The average production per person is therefore approximately 2 acre-feet per year.

There are 16 active wells in the general vicinity of Tri-City Landfill for which production capacity information was provided. These wells together have a capacity of approximately 72,000 acre-feet per year (3,6,7).

<u>Well #</u>	<u>Delivery Rate *</u>	<u>% Total Rate</u>	<u>Capacity (Acre-feet/yr)</u>	<u>Population Served</u>	<u>Distance (miles)</u>
26.5E4.3N	3,585	8.4	6,048	3,024	1-2
26.6E4N	2,749	6.4	4,608	2,304	1-2
26.9E5N	3,396	7.9	5,688	2,844	0.5-1
27.1E4N	2,327	5.4	3,888	1,944	1-2
27.9E5N	2,692	6.3	4,536	2,268	Level I
28.3E4.2N	1,906	4.5	3,240	1,620	closed**
28.5E4N	3,287	7.7	5,544	2,772	2-3
28.5E5N	3,234	7.6	5,472	2,736	Level I
28.6E5.5N	2,828	6.6	4,752	2,376	Level I
28.8E5N	4,073	9.5	6,840	3,420	Level I
28E5.5N	2,909	6.8	4,896	2,448	Level I
28E6N	3,531	8.3	5,976	2,988	Level I
29.9E5.5N	2,232	5.2	3,744	1,872	closed**
29E6N	2,394	5.6	4,032	2,016	1-2
30E4.3N	2,030	4.7	3,384	1,692	2-3
30E5.9N	1,597	3.7	2,664	1,332	2-3
Total	42,740	100.0	72,000		

\* units were not provided by SRP, but are not needed due to conversion to percentage.

\*\* capacity information was provided for these wells in order to calculate percentage of total possible capacity. All wells which have shown contamination are actually closed.

The total population subject to Level I contamination, based on capacity of closed SRP wells, is therefore 16,236 people.

## 6. Potential Contamination:

Specific information on various SRP wells is provided above. Population served by wells at a particular distance is reiterated below.



The Salt River Indian Community has two wells, which serve a total population of 6,500 people (maximum reservation population) (8,9). Since data on the actual contributions of these wells does not exist, assume that they contribute equally. There are no other sources of drinking water in this interconnected system (8). Well location information is given below.

The City of Mesa has 26 groundwater wells. These wells are used on a standby basis, providing an estimated 5 percent of the interconnected system's total production during the course of a year (10). The system serves a total of 380,000 people. No contamination of these wells has been detected to date (11). Well location information is given below (12).

<u>Distance (miles)</u>	<u>Purveyor</u>	<u>Wells</u>	<u>Population</u>
0 to 0.25		none	
0.25 to 0.5		none	
0.5 to 1	SRP	1 well	2,844
1 to 2	SRP	4 wells	9,288
	Mesa	# 24	731
	SRIC	Osborne well	3,250
2 to 3	Mesa	#s 7,8,9, 11,12,19	4,385
	SRP	3 wells	5,796
3 to 4	Mesa	#s 23,16, 21,18,15, 14,13,10	5,846
	SRIC	Longmore/ Chaparral	3,250

7. SRP wells are used for agricultural irrigation as well (3).

#### Surface Water

8. Flooding at various times has caused wastes from the site to be carried down the Salt River (1). If the landfill is a source of chlorinated solvents in groundwater, the flooding could be considered an observed release by direct observation.
9. Toxicity/Persistence/Ecotoxicity/Bioaccumulation (1,5):

<u>Compound</u>	<u>Tox</u>	<u>Pers</u>	<u>Ecotox</u>	<u>Bioacc (env)</u>
TCE	10	0.4	10	50
PCE	100	0.4	100	50
1,1-DCE	100	0.4	10	50
t-1,2-DCE	100	0.4	---	50
1,2-DCA	100	0.4	1	5
1,1-DCA	10	0.4	---	5
1,1,1-TCA	10	0.4	10	5



Toxicity/Persistence: 40  
Ecotoxicity/Persistence: 40  
Ecotox/Pers/Bioacc: 2,000

10. The Salt River is regulated so that it may be used for agriculture only (3).
11. The Salt River is intermittent, flowing only when water is released by SRP, which may occur less than once per year (3). The Salt River is thus unsuitable for fish.
12. Three endangered species may inhabit the Salt River within 15 miles downstream from the site. The Chiricahua leopard frog (Rana chiricahuensis) is found in habitats similar to those along the Salt River. It is an Arizona State-designated threatened species. The bald eagle (Haliaeetus leucocephalus) and the Yuma clapper rail (Rallus longirostris yumanensis) are both known to exist along the Salt River downstream from the confluence of the Salt River and the Verde River, though the exact location is unknown. The bald eagle is a Federally-designated endangered species, and the Yuma clapper rail is a Federally-designated threatened species (13). Since the exact locations of these species are unknown, actual contamination was not projected.



## REFERENCES

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3. Elliott, Gregg, Salt River Project, and Teryl K. Nuckols, E & E, telephone conversation, April 2, 1992.
4. Graf, Chuck, Arizona Department of Environmental Quality, and Teryl K. Nuckols, Ecology and Environment, Inc. (E & E), telephone conversation, April 2, 1992.
5. U.S. Environmental Protection Agency, Superfund Chemical Data Matrix, Appendix B-1, Tables for Non-radioactive Hazardous Substances, November 1991 (revised December 1991).
6. Elliott, Gregg, Salt River Project, and Teryl K. Nuckols, E & E, letter and enclosures, April 22, 1992.
7. Salt River Project, "Annual Water Quality Report," 1990.
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10. Haney, Bill, Mesa Department of Public Works, and Teryl K. Nuckols, E & E, telephone conversation, April 15, 1992.
11. Gaetjens, Jim, City of Mesa, Department of Public Works, and Teryl K. Nuckols, E & E, telephone conversation, April 2, 1992.
12. Bradford, Richard, City of Mesa, Department of Public Works, letter and enclosures, April 16, 1992.
13. Arizona Game and Fish Department, "Threatened Native Wildlife in Arizona," 1988.

**R E P O R T   T R A N S M I T T A L**

Date delivered to H-8-1:

Copies of this NPL Prioritization Project for Tri-City Landfill should be sent to the following agencies or individuals:

U.S. EPA  
Water Division  
Attn.: Clyde Morris  
W-7-2